



Published in final edited form as:

*Int J Infect Dis.* 2022 July ; 120: 125–131. doi:10.1016/j.ijid.2022.04.031.

## Geographic accessibility to health facilities predicts uptake of community-based tuberculosis screening in an urban setting

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### Abstract

**Objectives:** Annually, more than 30% of individuals with tuberculosis (TB) remain undiagnosed. We aimed to assess whether geographic accessibility measures can identify neighborhoods that would benefit from TB screening services targeted toward closing the diagnosis gap.

**Methods:** We used data from a community-based mobile TB screening program in Carabayllo district, Lima, Peru. We constructed four accessibility measures from the geographic center of neighborhoods to health facilities. We used logistic regression to assess the association between these measures and screening uptake in one's residential neighborhood versus elsewhere, with quasi-information criterion values to assess the association.

**Results:** We analyzed the screening locations for 25,000 Carabayllo residents from 49 neighborhoods. Pedestrian walk time was preferable to Euclidean distance or vehicular time in our models. For each additional 12 minutes walking time between the neighborhood and the health facility, the odds of residents using TB screening units located in their neighborhoods increased by 50% (95% CI: 26%–78%). Females had 9% (95% CI: 3%–16%) increased odds versus males of using a screening unit in their own neighborhood.

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Conflicts of interest

The authors have no competing interests to declare.

Ethical review

The Mass General Brigham Institutional Review Board determined that the study constituted exempt human subjects research (protocol 2019P002416).

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi: [10.1016/j.ijid.2022.04.031](https://doi.org/10.1016/j.ijid.2022.04.031).

**Conclusion:** Placing mobile TB screening units in neighborhoods with longer pedestrian time to access health facilities could benefit individuals who face more acute access barriers to health care.

### Keywords

TB diagnosis; Distance to health facility; Spatial; Intervention

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### Introduction

Tuberculosis (TB) is one of the leading infectious causes of death worldwide (World Health Organization, 2021). A major barrier to improved TB care and management is case detection; more than 30% of individuals with TB are estimated to remain undiagnosed annually, leading to poorer outcomes and increased transmission (World Health Organization, 2021). There are many barriers to accessing care, one of which is a person's ability to reach their local health facility on the basis of local geography (Hierink et al., 2021, Hofer et al., 2019, Lankowski et al., 2014, Qamar et al., 2016), such as long distances to the nearest facility, poor road network, lack of access to a vehicle, or elevation differences that make pedestrian travel difficult.

Community-based mobile TB screening units can reduce these geographic access barriers by bringing diagnostic opportunities to communities where individuals live and work. This promotes earlier diagnosis and improves patient outcomes (Golub et al., 2005). Mobile TB screening units have been used in diverse settings to provide a convenient location for screening (by symptom questionnaires or x-ray) and providing a sputum sample for bacteriologic testing (Madhani et al., 2020, Morishita et al., 2017, Okelloh et al., 2019, Yuen et al., 2021). In rural areas, mobile units decrease long travel distances to health facilities, which is often a dominant barrier to accessing TB care (Marahatta et al., 2020, Tulloch et al., 2015). In urban areas, mobile units may decrease travel time as well as address other barriers that prevent patients from using public health facilities, such as inconvenient hours and fear of being treated poorly by health facility staff (Bonadonna et al., 2017). To reduce disparities in TB diagnoses, mobile screening units would ideally serve communities that face the greatest access barriers.

We sought to assess whether neighborhood-level geographic accessibility measures can be used to identify neighborhoods that would most benefit from community-based TB screening services. Few studies have compared the ability of different geographic accessibility measures to predict health services uptake in urban settings. In studies comparing linear distance, shortest network distance, and shortest network time to health facilities, these methods did not correlate perfectly with each other, particularly in urban areas (Apparicio et al., 2008, Masoodi et al., 2015). These studies have not compared the ability of different measures to predict an independent health service usage outcome. Therefore, we constructed different measures of geographic accessibility to health services for the neighborhoods of Carabayllo district in Lima, Peru and assessed the association between these measures and uptake of services offered by a mobile TB screening program.

## Methods

### Setting

Peru is a middle-income country with an estimated TB incidence of 116 per 100,000 population in 2020 (World Health Organization, 2021). TB services are concentrated in primary-level health facilities, which serve defined catchment areas. TB screening and treatment are free but diagnostic delays are nonetheless common partly because of the inconvenience of accessing health facilities (Bonadonna et al., 2017). To improve TB diagnosis, a mobile screening program was implemented in 2019, bringing free TB screening and evaluation services into community settings (Yuen et al., 2021). Mobile screening units were stationed in residential areas, markets, transport terminals, educational institutions, and companies, as well as outside health facilities (primary-level health facilities and regional referral facilities). The mobile screening unit locations were determined through consultation with community leaders, and a community engagement program promoted awareness of the mobile screening units (Galea, 2021). To make community engagement and publicity more efficient, the mobile screening unit typically moved around within clusters of neighborhoods, spending a few days within each neighborhood before moving to a new area. Free digital chest x-rays were offered at the mobile unit; individuals with abnormal chest radiographs underwent further evaluation, and anyone who was diagnosed with TB was referred to their local health facility.

This analysis focuses on residents of Carabayllo district, a municipality on the periphery of Peru's capital, Lima, where the screening program was first implemented. Carabayllo's population is estimated at 351,000 (National Institute of Statistics and Informatics Peru, 2017) and served by 12 primary-level public health facilities with defined catchment areas. Neighborhoods were mapped before the implementation of the mobile screening program, and the residential neighborhood was recorded for all attendees. There were multiple neighborhoods per health facility catchment area. Thus, for many residents, their health facility would be located in a different neighborhood from their residence and they might benefit from being able to visit a TB screening unit in their neighborhood rather than going to their health facility located elsewhere. The district contains developed urban areas, which are mostly flat, densely settled with multistory buildings, and served by paved roads and less developed hilly areas that are dominated by more basic housing structures, many of which are accessible only by footpaths or unpaved roads. The urban areas are served by public buses and minivans that run along major roads, as well as cars and 3-wheel moto-taxis (auto-rickshaws) that can be hired for private journeys.

### Accessibility measures

To monitor the TB screening program reach, a neighborhood map of Carabayllo was created, and all mobile unit attendees were asked for their residential neighborhood. The map comprised a region of 84 contiguous neighborhoods (0.04–4.42 km<sup>2</sup> each, 50.95 km<sup>2</sup> total area; Figure 1) belonging to nine health facility catchment areas (4–24 neighborhoods per catchment area). We constructed four measures to serve as proxies for geographic accessibility using ArcGIS Pro software (version 10.5). All measures were calculated

from the geographic center of the neighborhood—the neighborhood centroid—to the health facility in whose catchment area the neighborhood was located.

The four measures were Euclidean distance, pedestrian walk time, pedestrian walk time adjusted for elevation, and vehicular time. Euclidean distance was defined as the straight-line distance (in kilometers [km]) from the neighborhood centroid to the local health facility. We inferred the shortest pedestrian time from the maps available through ArcGIS Pro using the Network Analyst functionality, which considers both roads for use by vehicles and pedestrians and solely pedestrian pathways and stairs. To estimate pedestrian time, ArcGIS assumes an average walking speed of 5km/hour (esri: ArcGIS Online (1), 2021). To estimate pedestrian time adjusted for elevation, we used Naismith rule (Naismith, 1892), where adjusted time = 12 minutes per kilometer + 10 minutes per 100-meter elevation, where elevation was equal to the difference between the neighborhood centroid elevation and the health facility elevation. ArcGIS estimates vehicular time, considering only the roads along which vehicles could travel using a proprietary road network dataset (“StreetMap Premium”, [esri: ArcGIS Online (2), 2021]) and uses historical traffic time to calculate travel times for the roads in question, thus implicitly adjusting for elevation and road quality (esri: ArcGIS Online (1), 2021).

## Outcomes

We aimed to assess whether geographic accessibility measures can predict if a neighborhood will preferentially benefit from a community-based TB screening unit (i.e., one that is placed in a residential area or in a location used by the local community such as a park). Specifically, we wanted to identify neighborhoods where more residents would be screened for TB because the mobile unit presence in their neighborhood reduced geographic access barriers that would have otherwise prevented them from going to a health facility. To operationalize this outcome, we conceptualized the relationship between access barriers and screening uptake as illustrated in Figure 2. We conceptualized preferential benefit as reaching individuals who face geographic barriers to accessing health facilities (Group A in Figure 2). On the basis of where individuals who are facing different kinds of barriers would likely use a screening unit, we considered two outcomes: (1) using a screening unit at a community location in one’s neighborhood of residence versus using a screening unit anywhere else (including community locations outside their neighborhood, work-related locations, or outside any health facility, not just the one associated with their catchment area) and (2) using a screening unit located at a community location in one’s neighborhood versus using a screening unit stationed outside a health facility (any health facility, not just the one associated with one’s catchment area). The first outcome reflects the specific impact of geographic access barriers, whereas the second potentially reflects the impact of different reasons why individuals might not access health facilities.

## Analysis

We included all individuals who attended the mobile TB screening units between February 7, 2019 and February 6, 2020 and those who lived in a neighborhood where there was at least one community screening location during this time period. We used logistic regression to assess the association between each of the four accessibility measures and

our two outcomes and used generalized estimating equations to account for the clustering of individuals within neighborhoods. All analyses used individual-level data; outcomes, age, and sex were at the individual level. All geographic accessibility measures and number of days the screening unit was in the neighborhood were measured at the neighborhood level, and each individual in the dataset was assigned the data for their neighborhood for these measures. We adjusted for age, sex, and number of days that the screening van was in the individual's neighborhood in total over the study period. We categorized age into three groups: <18, 18–59, and 60+ years. The rationale for these age groups is that they access health care differently: individuals under 18 are considered minors and cannot access health care services in Peru without a guardian, whereas individuals 60 and over are considered “older adults” and should be provided with specialized health and social services that are responsive to their needs (Ley de la persona adulto mayor, 2016). We assessed which of the 4 measures was most highly associated with each outcome on the basis of the quasi-information criterion (QIC) values of the regression models. For each of these eight models (two outcomes with each of the four geographic accessibility measure exposure variables), we assessed spatial autocorrelation using a bivariate global Moran I. In regression analysis, we also ran spatial dependence diagnostics using the Lagrange multiplier lag and error tests to assess whether a spatial autocorrelation term should be included in the models. These two tests were run using Open-GeoDa V1.18.0—a freely distributed software package.

To assess if the impact of accessibility on where individuals were screened varied by sex or age, we tested for interactions between the accessibility measure and age group (as defined previously) and sex in all models. We used RStudio version 2021.09.0 and used the gee package. To obtain the covariance matrixes for the interaction models, we used the gee pack package.

## Results

Of the 84 mapped neighborhoods of Carabayllo district, 49 had at least one community screening location served by the mobile TB screening unit between February 7, 2019 and February 6, 2020. The mobile TB screening unit spent a median of 2 (interquartile range 1–5) days in each of the 49 neighborhoods. A total of 25,000 residents from these 49 neighborhoods used a screening unit during this period and all were included in our analysis. Among these 49 neighborhoods, the median Euclidean distance to a health facility was 0.70 km (range 0.12–4.41), median pedestrian walk time was 11.9 minutes (range 1.9–58.0), median elevation-adjusted pedestrian walk time was 18.1 minutes (range 2.6–63.8), and median vehicular time was 3.33 minutes (range 0.44–10.55).

### **Analysis 1: Assessing whether geographic accessibility measures identify individuals facing geographic barriers to accessing health facilities**

Of all 25,000 screened individuals in our analysis, 8360 (33%) used community mobile TB screening units located in their neighborhood of residence and 16,640 (67%) used screening units located elsewhere (outside their neighborhood, at a health facility, or at a work-related location). In the adjusted regression models, all accessibility measures were associated with the odds of using a screening unit at a community location in one's neighborhood of

residence versus using a screening unit elsewhere (Table 1). For all these four measures, increased distance/time to the local health facility was associated with increased odds of using community mobile TB screening units located in their neighborhoods versus being screened anywhere else. On the basis of the QIC values of the models, the model using pedestrian walk time was preferable to the models using other accessibility measures (QIC 28,542; Table 1, Figure 1; maps showing the other three = geographic accessibility measures are in the online Appendix, Figures A1–3). The spatial dependence tests between pedestrian walk time and outcome were not significant. For each additional 12 minutes walking time (approximate time to walk 1 kilometer) between the neighborhood centroid and the health facility, the odds of using screening units located in one's own neighborhood increased by 50% (95% CI: 26%–78% increase;  $P$ -value <0.001) (Table 2). We also found that females had a 9% (95% CI: 3%–16%;  $P$ -value = 0.006) increased odds of using screening units located in their own neighborhood compared to males (Table 2). No significant interaction was detected between pedestrian walk time and age or sex as predictors.

### **Analysis 2: Assessing whether geographic accessibility measures identify individuals facing barriers of any kind to accessing health facilities**

Of all 25,000 screened individuals in our analysis, 8360 (33%) used community mobile TB screening units located in their neighborhood of residence and 4006 (16%) used screening units located outside a health facility. The remaining 12,634 (51%) residents used screening units in other locations (such as work-related locations) and were excluded from this analysis. In adjusted regression models, all accessibility measures were associated with the odds of using a screening unit located at a community location in one's neighborhood versus using a screening unit stationed outside a health facility (Table 1). For all four of these measures, increased distance/time to the local health facility was associated with increased odds of using a screening unit at a community location in one's neighborhood of residence versus using a screening unit stationed outside a health facility. On the basis of the QIC values of the models, the model using pedestrian walk time was preferable to the models using other accessibility measures (QIC = 13,966; Table 1). The tests for spatial dependence between pedestrian walk time and our outcome were not significant.

Using pedestrian walk time, we found a significant interaction with age category. Among individuals aged 18–59 years, for each additional 12 minutes walking time (approximate time to walk 1 kilometer) between the neighborhood centroid and the health facility, the odds of using screening units located in one's own neighborhood increased by 80% (95% CI: 42%–129% increase;  $P$ -value <0.001) (Table 3). However, for individuals aged 60+ years, the odds of using screening units located in one's own neighborhood increased by only 50% (95% CI: 19%–88%;  $P$ -value = 0.001); this was significantly different from the association observed for adults aged 18–59 years ( $P$ -value = 0.002 for the interaction). For individuals aged <18 years old, the odds of using screening units located in one's own neighborhood increased by 82% (95% CI: 33%–149%;  $P$ -value <0.001). This was not significantly different from the odds ratio for either other age group ( $P$ -value = 0.91 compared with the 18–59 age group and  $P$  = 0.090 compared with the 60+ age group). We also found that females had 17% decreased odds of seeking screening in their own



neighborhood (vs outside a health facility) than males (95% CI: 9%–24% decrease; *P*-value <0.001).

## Discussion

Our findings suggest that estimating pedestrian walk time to health facilities can help prioritize neighborhoods where residents would most benefit from mobile TB screening units. We found that as the estimated pedestrian travel time to a health facility increased, residents were more likely to use mobile TB screening units located in their neighborhoods. This association was present for both comparator outcomes that we assessed, suggesting that travel time is an indicator for geographic barriers as well as general barriers that prevent individuals from attending health facilities. Our results suggest that placing mobile TB screening units in neighborhoods with longer estimated pedestrian travel time to health facilities could preferentially benefit individuals who face more acute health care access barriers.

Our findings complement previous studies which found that reduced geographic accessibility is associated with poorer TB diagnostic indicators, adherence, and treatment outcomes (Robsky et al., 2020, Shargie et al., 2007, Tripathy et al., 2013). Studies in Ethiopia, Malawi, and Asia found associations between reduced geographic accessibility of health facilities and both TB diagnostic delays (Cai et al., 2015, Tadesse et al., 2013) and lower case notification rates (Bui et al., 2018, Dangisso et al., 2015, MacPherson et al., 2019, Shaweno et al., 2017). In these studies, the association between geographic access and case notifications was consistently attributed to lower case detection rather than true TB prevalence being lower in places that are further from health facilities. This is supported by studies in which participants report distance to a health facility as a primary reason for nonconsultation (Lansang et al., 2021), as well as by the association with diagnostic delays described previously (Cai et al., 2015, Tadesse et al., 2013). Although our study does not identify the reasons for attending a community location rather than a health facility, it does support the idea that placing mobile TB services in areas that are further from health care facilities could increase TB diagnoses and reduce diagnostic delays.

The estimated pedestrian travel time from the neighborhood centroid to a health facility performed somewhat better than the Euclidean distance and the estimated driving time for predicting mobile TB screening unit usage within a neighborhood in this setting. Our finding is consistent with other studies in urban settings in Iran and Canada that found that Euclidean distance-based measures were not well correlated with those on the basis of networks, and therefore, if possible, Euclidean distance should not be used as a proxy for geographic accessibility in place of a network distance (Apparicio et al., 2017, Masoodi et al., 2015). However, two other urban studies in Durban, South Africa, and Kampala, Uganda found little difference between Euclidean distance and network travel time as predictors of HIV virologic failure among ART users (Chen et al., 2019) and TB outcomes (Robsky et al., 2020), respectively. Another Canadian study in Montreal concluded that using Euclidean distance as a proxy for network distance can introduce substantial errors when considering the city periphery (Apparicio et al., 2003). This might be especially applicable to our setting given the predominance of hilly areas on the outskirts of Carabayllo, where roads are less

likely to follow straight lines and Euclidian distance does not capture the difficulty of walking up and down hills. Our study concludes that, where possible, network distances or times are likely preferable over Euclidean distances. Fortunately, the current availability of easy-to-use software and publicly available maps make the calculations of network distances and times more feasible.

Although pedestrian travel time was associated with using mobile TB screening units located in one's own neighborhood compared with using screening units either anywhere else or outside a health facility, these two outcomes yielded different associations with sex and age. When considering all possible screening sites, females were more likely to use screening units within their neighborhoods than males, perhaps suggesting more limited mobility in general, as has been observed elsewhere (Foley et al., 2022, Navarrete-Reyes et al., 2017). However, when we compared individuals using screening units in their own neighborhoods with individuals using screening units outside health facilities, males were more likely to use those in their neighborhoods. This is consistent with lower health service usage among men as observed in multiple countries due to factors such as men's working hours not allowing them to access health facilities, feeling unwelcome in health facilities organized around female-focused services, gendered social norms that discourage men from seeking health care, and the fact that large numbers of women access health care for antenatal services (Dachs et al., 2002, Dovel et al., 2020, Gaiha et al., 2020). Furthermore, the association between pedestrian travel time and use of a neighborhood- or health facility-located screening unit was weaker for older adults perhaps because they are more likely to have health conditions requiring them to visit health facilities regularly. Thus, although pedestrian travel time may help identify neighborhoods where residents would benefit from mobile screening units, uptake and benefit may vary across different demographic groups.

In our study, one strength lies in our comparison of four different geographic access measurements. Few studies have compared geographic access measurements in middle-income urban settings, and our findings add to the evidence for using networks instead of Euclidean distances. However, one limitation is the lack of access to individuals' residential locations; therefore, we used the neighborhood centroid as a proxy for location, which may be more or less accessible to the health facility than their home and has been previously shown to add measurement error to geographic access measures (Apparicio et al., 2017). However, this is unlikely to have systematically biased our results because individual residence locations are expected to be distributed around the neighborhood centroid.

Another limitation is that our simple conceptual framework assumes that the major reason why individuals would use a screening unit near their home is geographic access barriers. However, other reasons why individuals choose to access neighborhood services include feeling more comfortable in familiar surroundings or because the specific service being offered is more affordable or convenient than what they could access elsewhere. In addition, there may be reasons why individuals choose not to access neighborhood services, such as not wanting their neighbors to see them seeking TB care owing to stigma. In addition, the timing of when the mobile unit became available to individuals during the course of the intervention and geography were linked in the mobile unit deployment strategy, making it difficult to adjust for any potential impact of differential timing. Although we conclude



that travel time measures can help prioritize neighborhoods for screening services, we cannot with certainty attribute the associations we observed to geographic access barriers alone. Qualitative research could help illuminate the reasons for choosing different screening locations, which could further inform improvements in service delivery to individuals who face barriers to TB screening.

Improving access to TB diagnostic services is critical for closing the global TB detection gap, and effective mobile screening unit placement can help achieve this goal. Our study illustrates that TB programs can use network-based data—now publicly available with online mapping programs—to identify neighborhoods with the longest travel times to TB diagnostic facilities, which could particularly benefit from mobile TB screening units. Such spatially targeted use of screening interventions can close the gap between those who do and do not have easy access to diagnostic services and increase TB diagnoses in communities that likely experience lower TB case detection.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Funding

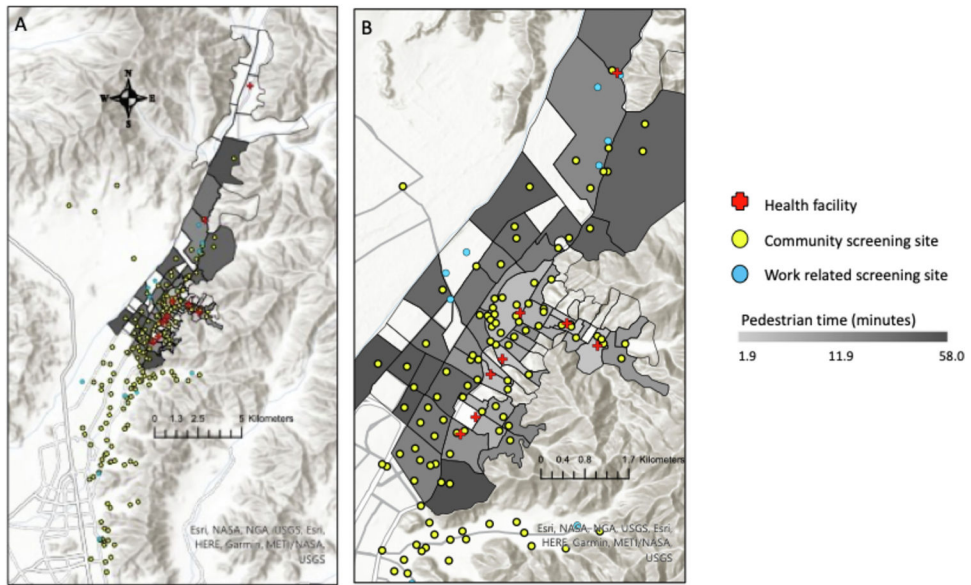
This work was supported by the National Institutes of Health (grant number 1DP2MD015102 to CMY). The screening program whose data were analyzed was funded by the Harvard Medical School Center for Global Health Delivery and grants from TB REACH and Johnson and Johnson Global Public Health. The funders had no role in the design, analysis, or writing of this study. The content is solely the responsibility of the authors and does not necessarily represent the official views of the funders.

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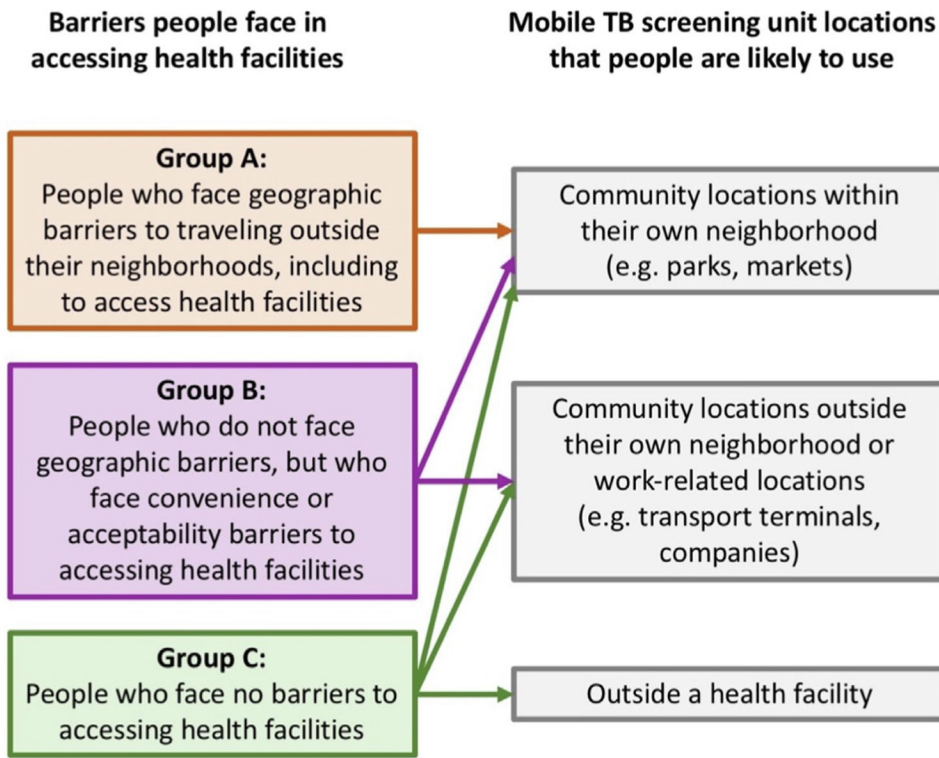
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**Figure 1.** Maps of (A) all Carabayllo neighborhoods (indicated by black borders), and locations of health facilities and other screening sites, and (B) the southern neighborhoods of Carabayllo, where most of the health facilities are located. The neighborhoods with at least one mobile TB screening unit location (and therefore included in our analysis) are shaded by pedestrian time from the neighborhood centroid to its designated health facility.



**Figure 2.** Conceptual framework for how access barriers affect use of mobile TB screening units. Group A are individuals who face geographic barriers to accessing health facilities because of their neighborhoods’ location or transportation options. These individuals are likely to use a mobile TB screening unit in a community location within their neighborhood (e.g., a park or a market) but not at a health facility; additionally, they would not use screening units in other neighborhoods since geographic access barriers would likely affect general mobility. Group B are individuals who face no geographic barriers to traveling outside their neighborhood but who do not use health facilities because of other barriers (e.g., inconvenient hours). These individuals are likely to use screening units either in their neighborhood or work-related locations but not at health facilities. Group C are individuals who face no barriers to accessing health facilities and are likely to use screening units in all three locations.

**Table 1**

Associations between mobile TB screening unit location and four measures of geographic accessibility to health facilities.

Accessibility measure, calculated between neighborhood centroid and health facility	Used a screening unit at a community site <sup>a</sup> in one's neighborhood vs anywhere else; odds ratio (95% CI) <sup>b</sup>	P-value	QIC	Used a screening unit at a community site <sup>a</sup> in one's neighborhood vs at a health facility; odds ratio (95% CI) <sup>b</sup>	P-value	QIC
Euclidean distance (per kilometer)	1.44 (1.02, 2.03)	0.037	29528	1.64 (1.11, 2.41)	0.013	14,684
Pedestrian time (per 12 mins) <sup>c</sup>	1.50 (1.26, 1.78)	<0.001	28542	1.74 (1.38, 2.21)	<0.001	13,966
Pedestrian time adjusted for elevation (per 12 mins) <sup>c</sup>	1.46 (1.22, 1.75)	<0.001	28625	1.67 (1.32, 2.11)	<0.001	14,017
Vehicular time (per 2.5 mins) <sup>d</sup>	1.40 (0.96, 2.05)	0.078	29560	1.62 (1.05, 2.52)	0.030	14,683

<sup>a</sup> A community site was defined as one in a residential area or a location used by the local community, such as a park or a market; this category excluded sites at health facilities and sites associated with work (such as transport terminals).

<sup>b</sup> All analyses are adjusted for sex, age (three categories [ $<18$ ,  $18-59$ ,  $>59$  years]), and days that a screening van was in the neighborhood of residence of the individual; all analyses also adjust for nonindependence of individuals who live in the same neighborhood.

<sup>c</sup> This approximates the time to walk 1 km assuming an average walk speed of five kilometers per hour.

<sup>d</sup> This approximates the time to drive 1 km assuming an average driving speed of 2.5 kilometers per hour.



Predictors of using a mobile TB screening unit at a community site<sup>a</sup> in one's neighborhood vs anywhere else.

**Table 2**

Predictor	Odds ratio (95% CI)	P-value
Pedestrian time (per 12 minutes) <sup>b</sup>	1.50 (1.26, 1.78)	< 0.001
Age		
<18 years	1.66 (1.48, 1.86)	<0.001
18-59 years	Reference group	
>59 years	1.16 (1.04, 1.29)	0.010
Sex (Female vs Male)	1.09 (1.03, 1.16)	0.006
Days the screening unit was in the neighborhood (per day)	1.08 (1.05, 1.10)	< 0.001

<sup>a</sup>A community site was defined as one in a residential area or a location used by the local community, such as a park or a market; this category excluded sites at health facilities and sites associated with work (such as transport terminals).

<sup>b</sup>This approximates the time to walk 1 kilometer, assuming an average walk speed of five kilometers per hour.

Predictors of using a mobile TB screening unit at a community site<sup>a</sup> in one's neighborhood vs at a health facility site.

**Table 3**

Predictor	Odds ratio (95% CI)	P-value
Pedestrian time among those aged <18 years (per 12 minutes) <sup>b</sup>	1.82 (1.33, 2.49)	<0.001
Pedestrian time among those aged 18–59 years (per 12 minutes)	1.80 (1.42, 2.29)	<0.001
Pedestrian time among those aged 60+ years (per 12 minutes) <sup>c</sup>	1.50 (1.19, 1.88)	0.001
Sex (Female vs Male)	0.83 (0.76, 0.91)	<0.001
Days the screening unit was in the neighborhood (per day)	1.07 (1.04, 1.10)	<0.001

<sup>a</sup> A community site was defined as one in a residential area or a location used by the local community, such as a park or a market; this category excluded sites at health facilities and sites associated with work (such as transport terminals).

<sup>b</sup> This approximates the time to walk 1 kilometer assuming an average walk speed of five kilometers per hour.

<sup>c</sup> Significantly different from the odds ratio for those aged 18–59 years (*P*-value = 0.002).